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EXAMINER

WATKO, JULIE ANNE

ART UNIT PAPER NUMBER

2627

DATE MAILED: 10/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/791,002

Applicant(s)

HAMANN ET AL.

Examiner

Julie Anne Watko

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11-15 and 17-26 is/are rejected.
- 7) ☐ Claim(s) 10 and 16 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06/21/2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>03/01/2004</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1, 13, 17, 24, and their dependent claims 2-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "said heater" in line 5. There is insufficient antecedent basis for this limitation in the claims.

Claim 6 recites the limitation "said heater" in line 1. Should Applicant amend claim 1 to change the language of the indefinite "heater" limitation, the Examiner notes that a similar change may become necessary for claim 6.

Claim 13 recites the limitation "said heater" in line 2. There is insufficient antecedent basis for this limitation in the claims.

Claim 17 recites the limitation "said magnetic sensor" in line 1. There is insufficient antecedent basis for this limitation in the claims.

Claim 24 recites the limitation "The hard disk drive according to claim 18" in line 1. Claim 18 is drawn to a head, not to a drive; thus, the metes and bounds of the claim are unclear.

Claims 2-7 are indefinite by virtue of their dependency from indefinite claim 1.

3. Regarding claim 24: In the absence of a reasonably definite interpretation of a claim, it is improper to rely on speculative assumptions regarding the meaning of a claim and then base a

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rejection under 35 U.S.C. 103 on these assumptions (*In re Steele*, 305 F.2d 859,134 USPQ 292 (CCPA 1962)). See MPEP 2143.03.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-2, 4-6 are rejected under 35 U.S.C. 102(e) as being anticipated by Gillis et al (US Pat. No. 6822819 B1).

As recited in claim 1, Gillis et al show a heating device (including 902 and 1002) for a magnetic recording head, said heating device comprising: an electrical resistor 902 for Joule heating; at least one lead 1002 connected to said electrical resistor; and where said recording head includes a metallic structure (904, for example) that is disposed at (see locations of 904 and ABS in Fig. 9) an air bearing surface (ABS) of said recording head and where said heater 902 is disposed adjacent to (see locations of 902 and 904 in Fig. 9) said metallic structure 904, and where said heater 902 is located adjacent to the ABS of said recording head (see locations of 902 and ABS in Fig. 9).

As recited in claim 2, Gillis et al show that said heater 902 is electrically isolated from (see Fig. 10; see also col. 5, lines 28-31) a sensor 74 and an inductive write pole portion (P1, for example) of said recording head.

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As recited in claim 4, Gillis et al show that said heater has an average operating temperature in a range of about 200°C to about 800 °C (see col. 5, lines 45-47, “25-250° Celsius”, which overlaps the claimed range).

As recited in claim 5, Gillis et al show that an electrical resistance of said heater is in a range of about 50 Ohms to about 500 Ohms (see col. 5, lines 43-45, “preferably between about 25 and 250 ohms”, which overlaps the claimed range).

As recited in claim 6, Gillis et al show that said heater is comprised of one of NiCr, IrRh and NiFe alloys (“alloy of nickel and chromium”, see col. 5, lines 40-41).

6. Claims 8-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Terris et al (US Pat. No. 7068453 B2).

As recited in claim 8, Terris et al show a magnetic recording head for recording on a magnetic medium, said recording head comprising: an air bearing surface 12 (ABS) having a leading (right) edge and a trailing (left) edge (see arrow 23 for medium moving direction); a write gap (51, for example); a metallic structure 20 being disposed at said ABS; an electrical heating device 70 which generates a heat spot on said magnetic medium which is larger than a magnetic track width of said recording head (“resistive heater is wider than the data track and heats both the data track and adjacent tracks”, see abstract), and heats a portion of said magnetic recording head which is on a leading edge side of said write gap 51 of said magnetic recording head, and where said heater 70 is disposed adjacent (see Fig. 2) to said metallic structure 20 and adjacent to said ABS 12.

As recited in claim 9, Terris et al show that said heating device 70 is exposed (see Fig. 2) at an air-bearing surface 12 of said recording head and directly heats said magnetic medium 40.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gillis et al (US Pat. No. 6822819 B1).

Gillis et al show a head as described above.

As recited in claim 3, Gillis et al are silent regarding the claimed dimensions.

Official notice is taken of the fact that it is notoriously old and well known in the magnetic head art to routinely modify a magnetic head structure in the course of routine optimization/ experimentation and thereby obtain various optimized relationships including those set forth in claim 3.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have had the magnetic head of Gillis et al satisfy the relationships set

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forth in claim 3. The rationale is as follows: one of ordinary skill in the art would have been motivated to have had the magnetic head of Gillis et al satisfy the relationships set forth in claim 3 since it is notoriously old and well known in the magnetic head art to routinely modify a magnetic head structure in the course of routine optimization /experimentation and thereby obtain various optimized relationships including those set forth in claim 3. Moreover, absent a showing of criticality (i.e., unobvious or unexpected results), the relationships set forth in claim 3 are considered to be within the level of ordinary skill in the art.

Additionally, the law is replete with cases in which when the mere difference between the claimed invention and the prior art is some range, variable or other dimensional limitation within the claims, patentability cannot be found.

It furthermore has been held in such a situation, the Applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Moreover, the instant disclosure does not set forth evidence ascribing unexpected results due to the claimed dimensions. See *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338 (Fed. Cir. 1984), which held that the dimensional limitations failed to point out a feature which performed and operated any differently from the prior art.

10. Claims 11-15, 17, 19-20, 23 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maat (US Pat. No. 6940691 B2) in view of Terris et al (US Pat. No. 7068453 B2).

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As recited in claim 11, Maat shows a magnetic recording head (see Fig. 3B), comprising: an inductive write head, where said write head has a write gap WG, an electrical heating device located on a leading edge side (see col. 3, lines 48-51, "Although FIGS. 3A-3B show the heater 20 located in the write gap WG, the heater may also be located outside the write gap, for example above pole P2 or below P1 in FIG. 3A") of said write gap WG, where said heater 20 is disposed adjacent to a metallic structure (P1 or P2, for example) at an air bearing surface (ABS) of the recording head.

As recited in claim 11, Maat is silent regarding a read sensor, wherein said heating device generates a heat spot on the ABS which is larger than a magnetic track width.

As recited in claim 11, Terris et al show a read sensor 60, wherein heating device 70 generates a heat spot on the ABS (see 70 in Fig. 1) which is larger than a magnetic track width (see 21 in Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the read sensor. The rationale is as follows: one of ordinary skill in the art would have been motivated to reproduce data as is notoriously well known in the art.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the heating device of Maat to generate a heat spot on the ABS which is larger than a magnetic track width as taught by Terris et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to generate a heat spot on the ABS which is larger than a magnetic track width so as to heat the data track very efficiently while minimizing a heater temperature for a given required media temperature as taught by Terris et al (see col. 2, lines 25-38).

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As recited in claim 12, Maat shows that said write head includes a first magnetic pole (P1 or P2) and a second magnetic pole (P2 or P1), and wherein said second magnetic pole is located on a trailing edge side of said first magnetic pole.

As recited in claim 13, Maat shows that at least a portion of said heater 20 is exposed at said ABS (see Fig. 3B).

As recited in claim 14, Maat is silent regarding a perpendicular recording head.

As recited in claim 14, Terris et al show a perpendicular recording head (see col. 1, lines 10-11).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the head of Maat a perpendicular recording head as taught by Terris et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to make the head a perpendicular recording head in order to approach ultra-high recording density as taught by Terris et al (see col. 2, lines 54-60).

As recited in claim 15, Maat is silent regarding a longitudinal recording head.

As recited in claim 15, Terris et al disclose a longitudinal recording head (see col. 1, lines 30-33).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the head of Maat a longitudinal recording head. The rationale is as follows: one of ordinary skill in the art would have been motivated to make the head a longitudinal recording head in order to make the head compatible with commercially-available disk drives as taught by Terris et al (see col. 1, lines 30-33).

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As recited in claim 17, Maat is silent regarding whether said read sensor is a magnetoresistive element.

As recited in claim 17, Terris et al show a magnetoresistive element ("MR", see col. 1, line 42).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add an MR to the head of Maat as taught by Terris et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to add an MR in order to provide high read sensitivity during data reproduction as is notoriously well known in the art.

As recited in claim 19, Maat is silent regarding the numerical limitations recited in claim 19.

Official notice is taken of the fact that it is notoriously old and well known in the magnetic head art to routinely modify a magnetic head structure in the course of routine optimization/ experimentation and thereby obtain various optimized relationships including those set forth in claims 19-20.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have had the magnetic head of Maat satisfy the relationships set forth in claims 19-20. The rationale is as follows: one of ordinary skill in the art would have been motivated to have had the magnetic head of Maat satisfy the relationships set forth in claims 19-20 since it is notoriously old and well known in the magnetic head art to routinely modify a magnetic head structure in the course of routine optimization /experimentation and thereby obtain various optimized relationships including those set forth in claims 19-20. Moreover,

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absent a showing of criticality (i.e., unobvious or unexpected results), the relationships set forth in claims 19-20 are considered to be within the level of ordinary skill in the art.

Additionally, the law is replete with cases in which when the mere difference between the claimed invention and the prior art is some range, variable or other dimensional limitation within the claims, patentability cannot be found.

It furthermore has been held in such a situation, the Applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Moreover, the instant disclosure does not set forth evidence ascribing unexpected results due to the claimed dimensions. See *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338 (Fed. Cir. 1984), which held that the dimensional limitations failed to point out a feature which performed and operated any differently from the prior art.

As recited in claim 23, in addition to the above teachings, Maat shows a hard disk drive (see ¶ 0003), which inherently comprises a spindle and motor for rotating a magnetic disk; and an arm comprising a suspension and the magnetic recording head, for selectively locating said magnetic recording head over said magnetic disk.

As recited in claim 25, Maat shows a thermally-assisted recording method, comprising: heating a spot (part of 20) on an air bearing surface (ABS) of a magnetic recording head (“TAMR head”, see col. 3, line 35) utilizing an electrically resistive heater 20, where said spot is located on a leading edge side (see col. 3, lines 48-51, “Although FIGS. 3A-3B show the heater 20 located in the write gap WG, the heater may also be located outside the write gap, for

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example above pole P2 or below P1 in FIG. 3A”) of a write gap (WG) of said magnetic recording head.

As recited in claim 25, Maat is silent regarding generating a heat spot on a recording medium which is larger than a magnetic track width.

As recited in claim 25, Terris et al show generating a heat spot on a recording medium which is larger than a magnetic track width.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to generate a heat spot on a recording medium of Maat which is larger than a magnetic track width as taught by Terris et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to easily implement the heater in a head structure and to heat the data track very efficiently by minimizing the required heater temperature for a given required media temperature as taught by Terris et al (see col. 2, lines 25-38).

As recited in claim 26, Maat shows that said heating comprises using said electrically resistive heater 20 to (inherently) heat at least one magnetic pole layer (P1 or P2) in said magnetic recording head, and a portion of an air-bearing surface (ABS) of said magnetic recording head.

11. Claims 18, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maat (US Pat. No. 6940691 B2) in view of Terris et al (US Pat. No. 7068453 B2), and further in view of Gider et al (US PAP No. 20040027719 A1).

Maat shows a head as described above, including heater 20 within the write head.

As recited in claim 18, Maat is silent regarding at least one thermally disruptive layer between said heating device and said magnetic sensor which disrupts thermal conduction from said heating device to said magnetic sensor.

As recited in claim 18, Gider et al show at least one thermally disruptive layer 428 between a write head 418 and a magnetic sensor 412 which disrupts thermal conduction from said heating device to said magnetic sensor.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the head of Maat with at least one thermally disruptive layer between the write head and a magnetic sensor. The rationale is as follows: one of ordinary skill in the art would have been motivated to limit temperature excursions experienced by the read sensor, and to control pole tip protrusion as taught by Gider et al (see ¶ 0009).

As recited in claim 21, Maat is silent regarding whether said at least one thermally disruptive layer comprises a heat sink.

As recited in claim 21, Gider et al show heat sink 428.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a heat sink as the thermally disruptive layer. The rationale is as follows: one of ordinary skill in the art would have been motivated to conduct heat away from the write head as is notoriously well known in the art.

As recited in claim 22, Maat is silent regarding whether said at least one thermally disruptive layer is comprised of plated copper.

As recited in claim 22, Gider et al show copper (see ¶ 0028).

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to use copper as the thermally disruptive layer as taught by Gider et al in the head of Maat. The rationale is as follows: one of ordinary skill in the art would have been motivated to provide high heat conductivity and to easily construct the layer by known methods as taught by Gider et al (see ¶ 0028).

The product by process limitations in these claims (e.g., “plated”) are directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessman*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final structure of the product “gleaned” from the process limitations or steps, which must be determined in a “product by process” claim, and not the patentability of the process limitations. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in “product by process” claims or not. Note that the applicant has the burden of proof in such cases, as the above case law makes clear.

Allowable Subject Matter

12. Claim 7 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

13. Claims 10 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gillis et al (US Pat. No. 6954327 B2) show a magnetic head comprising a separate heating element 902 as a heat source, wherein "Thin dielectric insulator materials (visible in FIG. 10 only) isolate heating element 902 from first pole piece 92 and first P1 pedestal 904. Preferably, heating element 902 is an electrically resistive heater ... made of a NICHROMETM material which is basically an alloy of nickel and chromium" (see col. 5, line 20-col. 6, line 11).

Hsu et al (US PAP No. 20050068671 A1) show a magnetic transducer comprising copper heat sink 52 between read sensor 35 and write head (comprising pole piece 41; see Fig. 7), wherein "Although the heat sink can extend to the ABS, preferably it does not extend to the ABS to avoid potential smearing problems" (see ¶ 0030; see also ¶ 0014).

Ju et al (US Pat. No. 6909674 B2) show a thermally assisted magnetic write head system comprising heating element 412 "positioned anywhere in the head, i.e. above and/or below a pole piece, at an air bearing surface" (see col. 4, lines 15-21), and further comprising thermal barriers (see col. 5, lines 3-13; see also col. 4, lines 49-59; see also Fig. 4B).

Fontana, Jr. et al (US Pat. No. 6999277 B2) show a magnetic head comprising heating element 116 "approximately as wide as the track width of the pole tip because it is generally undesirable to heat portions of the magnetic media disposed on data tracks that are adjacent to

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the track that is being written upon. It is also desirable, though not necessary, that the heating element 116 be fabricated slightly away from the air bearing surface (ABS) 92 of the head, to limit corrosion of the heating element 116 and to avoid possible electrical discharge from the heating device 112 to the media disk during a writing operation" (see col. 4, lines 50-61).

15. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julie Anne Watko whose telephone number is (571) 272-7597. The examiner can normally be reached on Monday through Friday, 1PM to 10PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dwayne D. Bost can be reached on (571) 272-7023. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Julie Anne Watko, J.D.
Primary Examiner
Art Unit 2627

October 17, 2006
JAW

A handwritten signature in black ink, appearing to read 'JAW', is written over the printed name and title of the examiner.